3119 Board #84 June 1 2:00 PM - 3:30 PM
The Association Between Incidental Physical Activity and Cardiorespiratory Fitness

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Cardiorespiratory fitness (CRF) is a strong predictor of cardiovascular disease and mortality. The association between structured physical activity (activity that meets consensus guidelines) and CRF is well established. Yet, the association between incidental physical activity (IPA; sporadic, unstructured physical activity that does not meet consensus guidelines) and CRF remains less clear.

PURPOSE: The primary objective of this study was to determine whether the duration and the expenditure of objectively measured IPA was associated with CRF in abdominally obese, adult men and women. A secondary objective was to determine whether sporadic moderate physical activity (MPA; accrued in bouts less than 10 min) was associated with CRF.

METHODS: Participants were abdominally obese (waist circumference >102 cm in men and >88 cm in women), self-reported inactive and weight-stable men (n=26) and women (n=62). IPA encompassed light physical activity (LPA; 1.2-9.99 METs) and sporadic vigorous physical activity (VPA; ≥10 METs). IPA was measured using the SenseWear Pro Armband (SWA) collected over a period of 7 days, and was categorized into duration (min/day) and expenditure (MET-min/day). CRF, measured as peak oxygen consumption per unit of time (peak VO2), was assessed using a graded treadmill test.

RESULTS: Participants accumulated an average of 318.6 ± 125.2 minutes of IPA per day, which was composed of 277.3 ± 117.3 minutes of LPA and 40.8 ± 16.8 minutes of IPA. Both duration (r=0.45, p=0.005) and expenditure (r=0.44, p=0.005) of IPA were significantly associated with CRF independent of sex, however, upon further control for body mass index (BMI) and age, neither association remained significant (p>0.10). Both duration (r=0.65, p=0.05) and expenditure (r=0.66, p=0.05) of sporadic MPA were independently predictive of CRF after controlling for covariates.

CONCLUSIONS: The principle finding is that IPA is not associated with CRF after control for BMI; however, sporadic MPA remains an independent predictor of CRF in abdominally obese adults. This finding suggests that while intensity of physical activity is important for improvement in CRF, benefits are not restricted to MPA that conforms to consensus guidelines. These initial findings have important public health implications.

3120 Board #85 June 1 2:00 PM - 3:30 PM
Functional Outcomes of Exercise Progression Models in the Elderly

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A challenge for our aging nation is to define interventions that can abate the decline in functional capacity and prevent a loss of independence.

PURPOSE: To determine differences between: (A) 4 weeks of a regionally specific training stimulus (RSTS) versus standard aerobic exercise training (AET); and (B) the effects of subsequent 8 weeks of progressive whole-body training protocol; on VO2max and combined 1RM strength (C1RM); and (2).

METHODS: Subjects over 70yrs, who scored between 218-480yds on a 6MWT were randomized to AET or RSTS for the first 4 weeks (Phase 1). AET consisted of walking/biking at 40-60% of HRR. RSTS consisted of specific muscle group exercises focused on the calf, thigh, buttocks, arms, shoulders, and torso. Each exercise was performed for 3 to 5min at ~40-70% of the MVC of the primary muscle group of interest. Subjects in both groups exercised for 60mins 3days per week and were progressed as tolerated. Subsequently, all subjects were advanced to a well-rounded, whole-body exercise program using established ACSM guidelines (Phase 2).

RESULTS: Both groups included 54 subjects, age =76±5yrs. After adjustment for baseline, there was a group by time effect in favor of RSTS for VO2max following phase 2 (see fig). Additionally, RSTS showed greater gains than AET in C1RM following both phase 1 (+40lbs vs. +17lbs, p<0.01) and phase 2 (+35lbs vs. +19lbs, p<0.01).

CONCLUSION: The gains in aerobic capacity and maximal strength at the end of phase 2 were superior in those who used RSTS during phase 1. These results suggest RSTS may serve as a physiological primer to allow peripheral barriers that limit functional capacity, in the elderly. Supported by 1RC1AG035822-01 and the Duke University Claude D. Pepper OAC (AG0287) to JDA
reference laboratory. The blood samples were taken weekly early in the morning before the athlete began their physical activity during a five week training phase, during the competition phase, the blood samples were taken: immediately after competition, two hours after competition, forty eight hours and seven days after competition. During the week after competition the athletes performed light physical activity for recovery.

RESULTS: All the analyzed variables presented a high significance difference (P<0.01) between an individual way each athlete showed a different response to training. The results presented in this study were an average, in some cases the athletes showed higher or lower values concluding that individual personalized physical activity training is strictly necessary for triathletes as a sport and also to avoid over training.

3123 Board #88 June 1 3:30 PM - 5:00 PM

Effect Of Ultra-Endurance Exercise On Markers Of Inflammation, Hemolysis, And Hepcidin
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(No relationships reported)

Endurance exercise such as marathon running has been shown to induce immunological responses similar to those seen in inflammation. It has also been identified as potentially leading to hemolysis. Hepcidin, recently recognized as a key regulator of systemic iron metabolism, has been found to be increased following a marathon race possibly induced by an exercise related increase in interleukin-6 (IL-6), a marker known to induce an acute phase response. It remains unknown whether ultra-endurance exercise leads to a more pronounced hepcidin response due to a cumulative effect of hemolysis and acute phase response.

PURPOSE: To investigate the effect of a 216-km run on leucocyte count and hemoglobin (hb), plasma concentrations of IL-6, C-reactive protein (CRP), haptoglobin and hepcidin in experienced endurance runners. Training is strictly necessary for triathletes as a sport and also to avoid over training.

METHODS: Venous blood samples were obtained from seven highly-trained male athletes (mean (SD): 52.0 (10.6) yrs, 176.6 (9.4) cm, 75.9 (7.8) kg) before the start and 42 km after and after termination of the race for the analysis of the above markers.

RESULTS: Leucocytes did not change significantly during the race (17.1 ± 16.8 vs. 17.2 ± 16.9 x10⁹/l). hb decreased at 42 km (95.9 ± 14.0 vs. 98.0 ± 14.4 g/l) and 128 km (87.4 ± 13.4 vs. 91.2 ± 13.1 g/l) (p<0.05). Plasma concentrations of IL-6 were decreased at 42 km (g/l: 0.60 (0.16) vs. 0.83 (0.22) pre-run, p<0.001) with no increase at test termination (17.2 (16.7) ng/l) did not reach statistical significance.

Conclusions: The clear increases in leucocytes and CRP throughout the race indicate inflammation probably induced by the increase of IL-6 in the early phase of the race. The hb decrease after 42 km demonstrates some hemolysis during the same period. Although inflammation has been described previously to stimulate hepcidin production, hepcidin remained unchanged during this ultramarathon in non-anemic males. Supported by Limbach Laboratory, Heidelberg, Germany

3124 Board #89 June 1 3:30 PM - 5:00 PM

Chronic Changes In Serum IL-6 And TNF-α Following 12 Weeks Of Concurrent Resistance And Aerobic Exercise Are Dependent On Exercise Mode And May Affect Adaptation.
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(No relationships reported)

PURPOSE: To examine physiological responses to concurrent resistance and land treadmill training (RT-ATM) compared to concurrent resistance and aquatic treadmill training (RT-ATM) and the chronic effect of each on serum TNF-α and IL-6 (cytokines associated with chronic inflammation, CVD, and skeletal muscle metabolism).

METHODS: Twenty-six untrained subjects (M: n=13, 98.6±17.1 kg, 182.2±6.2 cm, 34:1.1 yrs; F: n=13, 78.9±14.0 kg, 165.1±5.1 cm, 38:11 yrs) were screened to assess VO₂max (Bomcom, DEXA), and strength (Lifts: leg press, chest press, leg curl, lat pull, leg ext, triceps push-down, biceps curl). Subjects were then randomized into 2 groups (RT-ATM vs. RT-TAM vs. RT-ATM vs. RT-TAM vs. RT-ATM). Each performed progressive RT (2/wk, 3 x 8-12 @ 60%~<80% 1RM) for 12 wks. Both groups also performed 12 wks of aerobic LTM or AT (60~>85%VO₂max) respectively. AT or LTM occurred immediately following RT sessions and in isolation on a 3rd day during the wk. Kcal/session: Wk 1-6 = 250~>5000 kcal/session, Wk 6-12 = 500 kcal/session. Baseline tests were re-performed at wk 6 and after training. Blood samples were obtained in the rested state before and after training. Serum TNF-α and IL-6 was analyzed using a multiplex assay kit (Luminex®, Millipore®). A 2x2 Mixed Model ANOVA w/ repeated measures was used to examine absolute and relative changes in the independent variables listed in the table.

RESULTS:

![Table with data]

Values are means ± SE. %Δ = Individual change from baseline. Like letters = not significantly different between groups. †=Significant change from baseline (α ≤ 0.05).

CONCLUSION: Chronic RT-ATM and RT-ATM training elicited different effects on markers of chronic inflammation which may be related to differing health and fitness outcomes observed between our groups.

3125 Board #90 June 1 3:30 PM - 5:00 PM

Effects of Exercise Training on Inflammatory and Hypoxic Gene Expression in White Adipose Tissue
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(No relationships reported)

Obesity contributes to the development of inflammation and lifestyle related diseases, such as type II diabetes mellitus. Exercise training can have anti-inflammatory effects but it is unclear if it is a potent enough stimulus to positively affect white adipose tissue gene expression within the presence of an obese diet.

PURPOSE: To determine the effect of 12 weeks of a very high fat (VHF) diet and/or exercise training (EX) on glucose regulation and inflammatory and hypoxic gene expression within white adipose tissue.

METHODS: Male C57Bl6/J mice (n=39) were randomized into four groups: low-fat (LF)/sedentary (SED), LF/EX, VHF/SED, and VHF/EX. The VHF and LF diets were 60% and 10% fat, respectively. The mice were placed on the diet and exercise intervention concomitantly. Exercise training consisted of treadmill running 5 d/wk at 12 m/min, 5% incline, 40 min/d for 12 weeks. A subset of mice had intraperitoneal glucose tolerance tests (IPGTT). Quantitative real-time PCR was used to determine gene expression of inflammatory and hypoxia markers within white adipose tissue.

RESULTS: Animals on the VHF diet had impaired glucose tolerance as indicated by greater %Δ = Calculated From Each Individual Subjects Change From Baseline

CONCLUSION: Chronic RT-ATM and RT-ATM training elicited different effects on markers of chronic inflammation which may be related to differing health and fitness outcomes observed between our groups.